

High Performance Liquid Chromatograph for Ion Analysis

Ion Chromatograph



Advancing Ion Analysis Through Reliable Performance and Application Flexibility



For more than three decades, Shimadzu has advanced ion analysis through continuous innovation in ion chromatography and analytical science. Supported by extensive application expertise and a deep understanding of analytical workflows, Shimadzu offers ion chromatography solutions that include both suppressor and non-suppressor technologies to address a wide range of laboratory requirements. Today's analytical laboratories require systems capable of supporting diverse detection techniques, from conductivity detection to advanced workflows incorporating UV detection and post-column derivatization. Shimadzu systems are designed to deliver reliable detector performance, effective integration of analytical processes, and the flexibility needed to adapt to evolving application demands. This integrated approach helps laboratories achieve consistent results, streamline routine operation, and maintain confidence in data quality across a broad range of applications. For laboratories performing standardized and regulated methods, Shimadzu provides the reliability, reproducibility, and operational confidence required to support routine compliance-driven analysis. In addition to its ion chromatography portfolio, Shimadzu offers a broad range of instrumental solutions for inorganic ion analysis, enabling laboratories to select the analytical approach best suited to their technical and regulatory requirements.

Environmental Field

Tap water

Drain water

River water

Factory drainage

Soil water

Pharmaceutical and Food Fields

General Ion Analysis

Research

Development

Quality control

Introducing a New Ion Chromatography Solution

Nexera™ IC: Proven technology, enhanced performance and ease of use

The Nexera IC is ideal for routine ion analysis performed according to various regulatory testing methods, such as environmental testing.

The Nexera IC also combines the basic performance required of an ion chromatograph with a compact, space-saving design, and uncompromised performance. The system's automation streamlines the entire workflow, from preparing eluents and samples required for ion analysis to data acquisition and analysis. As a result, it reduces the burden of routine operations and improves work efficiency.

Basic Components

Solvent Delivery Pump (Built into the IC-150)

This metal-free pump features a serial double-plunger configuration that inhibits pulsation to provide stable solvent delivery.

Online Degassing Unit (Built into the IC-150)

By adopting a high-performance online degassing system with a small internal volume, eluent replacement is made easy while providing stable analyses. This eliminates the need for offline degassing by ultrasonic or other methods.

Automatic Eluent Generation Unit (Optional)

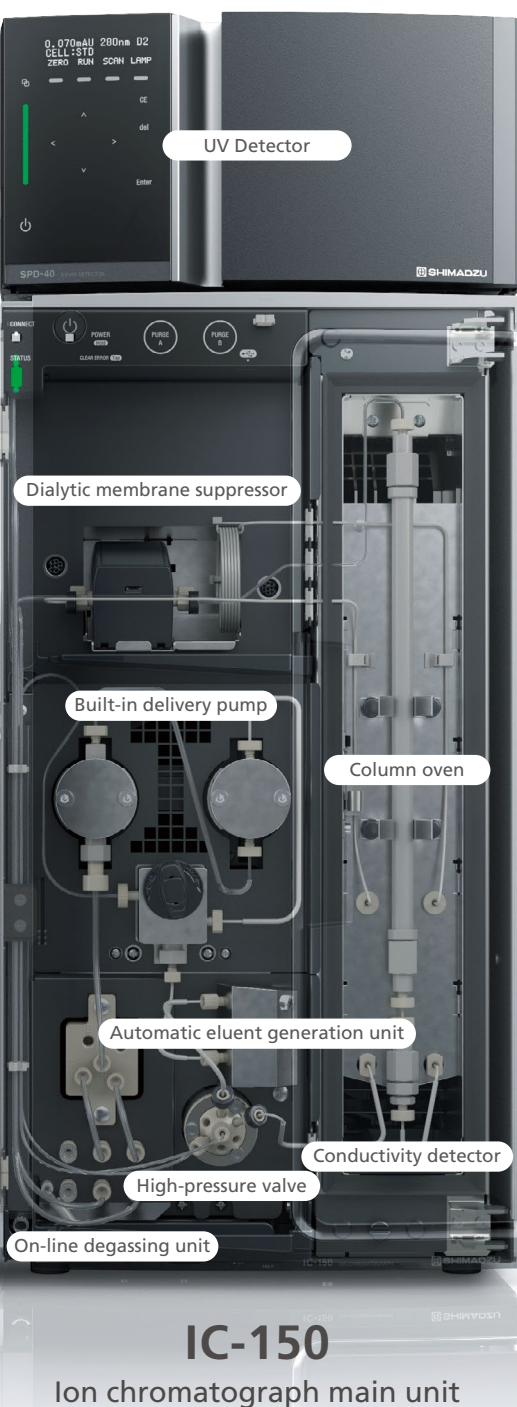
An automatic eluent generation unit employing a valve-switching mixing method is incorporated, enabling automatic preparation of eluents diluted at a selected ratio from three predefined dilution patterns (2×, 5×, 10×).

Column Oven (Built into the IC-150)

This forced air-circulation column oven with a standard pre-column heater offers excellent temperature control accuracy for column conditioning. It accommodates a wide range of columns, from short to long columns up to 300 mm.



SI-150
Autosampler



Conductivity Detector (Built into the IC-150)

With a dual temperature-control arrangement that places a temperature-controlled detector cell inside the column oven, conductivity detection, which is sensitive to temperature changes, can be performed with low-noise, stable baselines.

Electrodialytic Suppressor ICDS™-Ai/ICDS-Ci

Designed with a low internal volume to minimize band broadening and support improved separation of early-eluting analytes, this suppressor delivers high analytical performance and excellent sensitivity. A common platform is available for both anion and cation analysis, providing flexibility across a wide range of applications.

Autosampler SI-150

The total-volume injection method is included as a standard feature. In addition, the maximum injection volume can be increased to 7.5 mL by using an optional loop injection method. An optional port for manual injectors is also available.

Components for System Expansion

UV Detector SPD-40

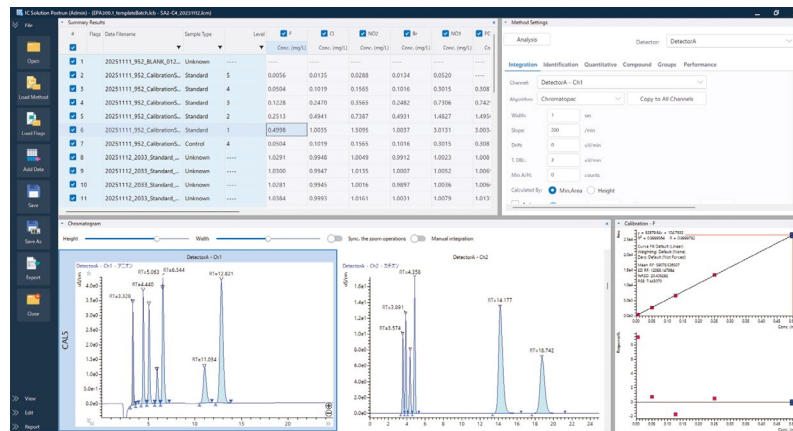
This UV detector can be installed above the IC-150 unit. It is helpful for selectively detecting nitrite and other UV-absorbing ions.

Dual Analysis System

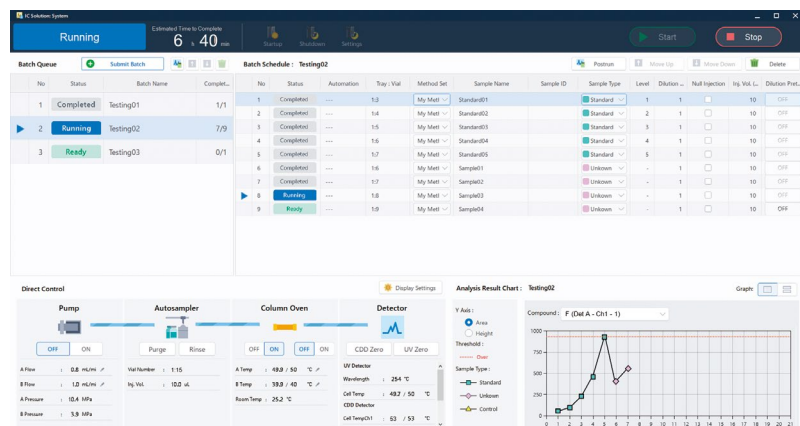
This system can simultaneously acquire analytical data for cations and anions. It is compatible with loop injection and allows changing the injection volume.

IC Solution

Laboratory managers can preconfigure methods and workflows in advance, allowing users to run analyses using standardized templates. This ensures consistent, reliable execution of routine daily analyses, including regulatory compliance testing.



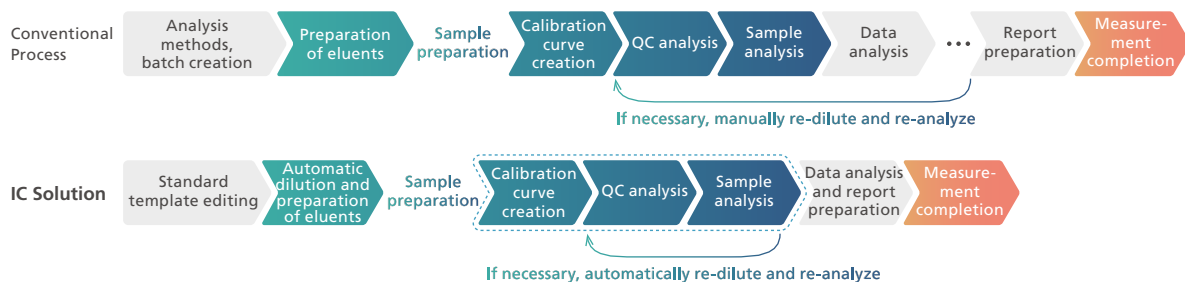
IC Solution Data Analysis Window



IC Solution Data Acquisition Window

Reliable analysis work regardless of the user's level of proficiency

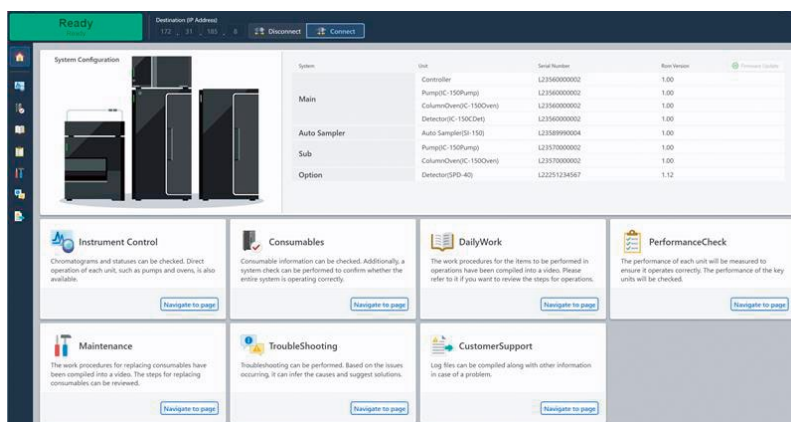
The analysis manager can create a template defining parameters such as conditions, pass criteria, and report creation. Then users can select and run the template, thereby enabling beginners to perform routine analysis. In the data analysis after acquisition, a list of pass/fail results can be viewed to see if each sample meets the required standards, and a report can be produced.



IC Support Software

Product

The IC Support software enables checking instrument status, troubleshooting guides, daily maintenance instructions, and videos. Consequently, the software can help restore operations as quickly as possible in the unlikely event of a problem, contributing to improved operational efficiency and cost savings.



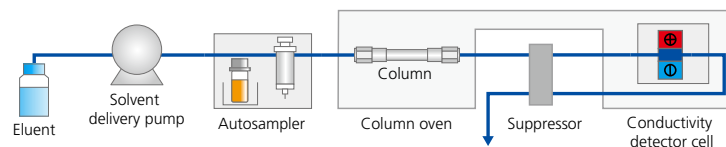
IC Support Software Home Screen

Suppressor

Anion Suppressor Unit ICDS-Ai

Efficiently achieves high sensitivity, high reliability, and high robustness

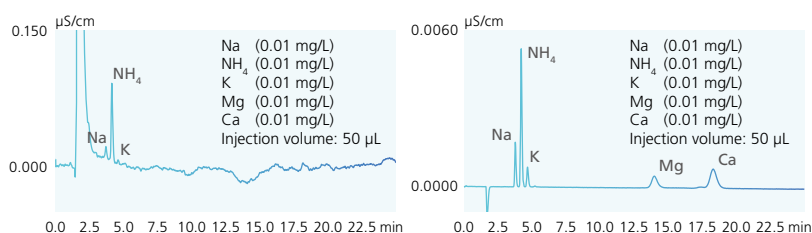
The ICDS-Ai electroalytic anion suppressor employs a reversed-flow eluent channel structure (patent No. 6897772) and optimized dialysis conditions, enabling highly efficient and stable suppression despite its low internal volume.



Flow-line diagram for the Nexera IC

Cation Suppressor Unit ICDS-Ci

Using the Nexera IC equipped with the newly developed ICDS-Ci electroalytic cation suppressor enables higher-sensitivity analysis than conventional non-suppressor systems.

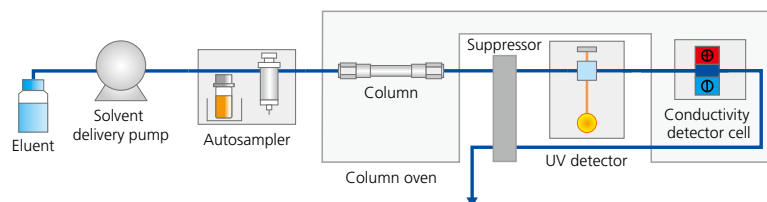


Cation analysis without the ICDS-Ci suppressor Cation analysis with the ICDS-Ci suppressor

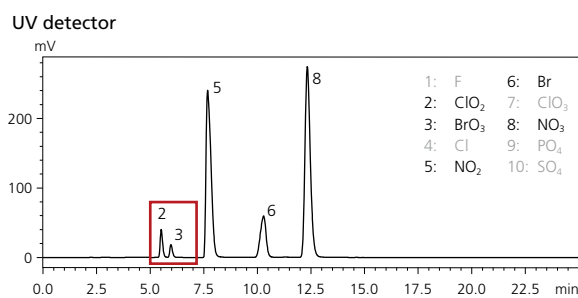
Flexible Configurations for Diverse Analytical Needs

Selective Detection with Optional UV Integration

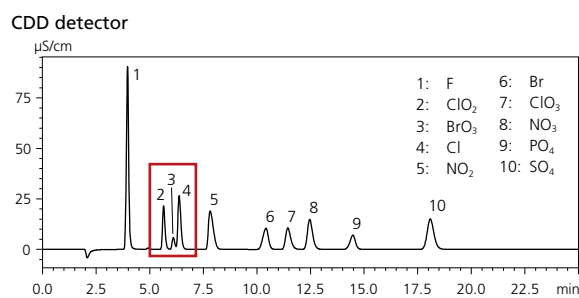
The optional UV detector extends the capabilities of Nexera IC beyond conductivity detection, enabling selective determination of UV-absorbing ions and compounds. This additional detection option is valuable for applications requiring enhanced selectivity in complex sample matrices and supports compliance with a wide range of internationally recognized environmental, water-quality, food, and industrial testing methods.



Flow-line diagram for the HIC-ESP with UV detector



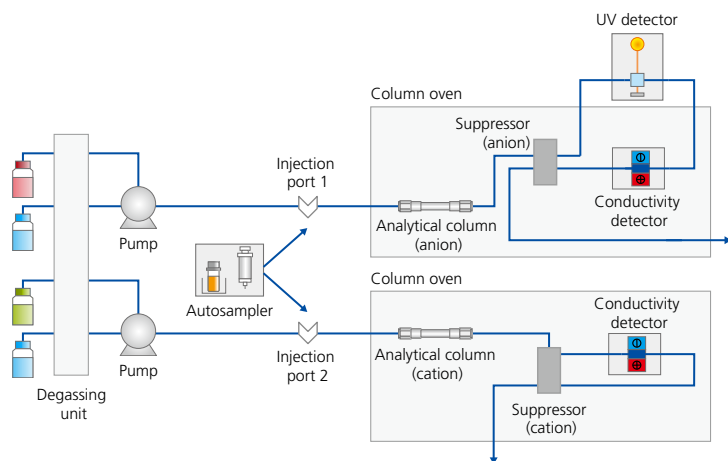
Chromatogram of 10 major anions (10 ppm each)



Chromatogram of 10 major anions (10 ppm each)

Simultaneous Anion and Cation Analysis

Nexera IC can be configured as a dual analysis system through the addition of an optional IC-150D unit, enabling simultaneous acquisition of anion and cation data within a single platform. Unified data management streamlines routine workflows, simplifying data review, processing, and reporting. Flexible injection options and compatibility with optional UV detection further expand application capabilities, allowing laboratories to tailor system configurations to specific analytical and regulatory requirements.



Flow-line diagram for the Nexera IC dual flow-line analysis system



Modular Ion Analysis System

Anion Suppressor Ion Chromatograph System

HIC-ESP —Maintains stable performance even after long periods

This anion chromatograph, equipped with an electrochemical suppressor, delivers highly reliable analytical results thanks to Shimadzu's HPLC-derived low carryover performance and excellent injection accuracy. In addition, samples can be cooled using an autosampler equipped with a cooling unit. It can satisfy ion analysis needs for a wide range of fields, such as environmental testing, pharmaceuticals, foods, and chemicals.



Non-Suppressor Ion Chromatograph System

HIC-NS —Non-suppressor configuration designed for simplicity and high sensitivity

HIC-NS is designed to support stable and sensitive non-suppressed ion analysis through advanced system engineering. Proprietary technologies, including pulseless solvent delivery and dual temperature control with a temperature-controlled detector cell integrated within the column oven, help minimize baseline fluctuations and maintain consistent analytical performance. This design supports reliable detection and robust day-to-day operation across a wide range of applications.

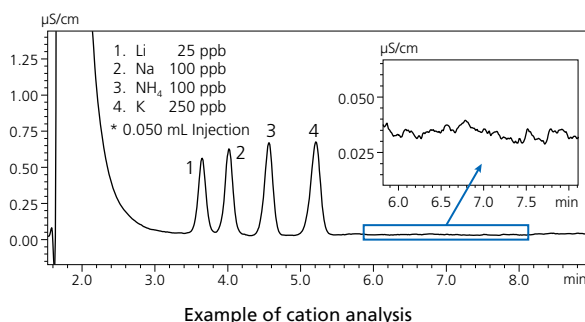


Forced air-circulation system

This temperature control system uses a fan mounted at the rear of the column oven to forcibly circulate air within the oven for temperature control. This is ideal for high-accuracy temperature control of columns and detector cells arranged within the oven, as well as for post-column reaction parts.

Low-pulsation delivery further reduces baseline noise

The microplunger pump adopted in the LC-40i reduces baseline noise and enables high S/N analyses.



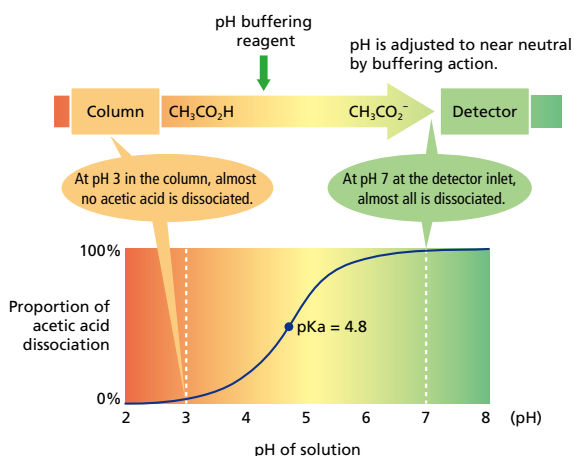
Application-Specific Ion Chromatography Solutions

Specialty of the Shimadzu Post-Column System

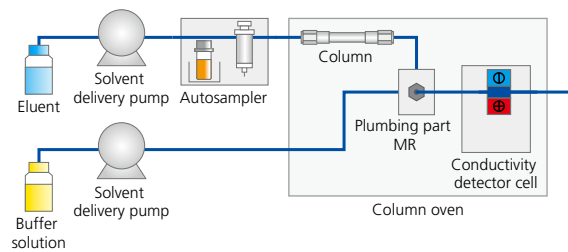
A high-efficiency reaction is a key feature of post-column systems. To ensure high-accuracy thermal reaction control, Shimadzu adopted a column oven (CTO-40C) featuring a forced air-circulation system that enjoys an established reputation in HPLC.

Nexera Organic Acid Analysis System

Designed for challenging sample matrices, including food products and fermented samples, the Nexera Organic Acid Analysis System combines ion-exclusion chromatography with Shimadzu's proprietary pH-buffered conductivity detection technology. This integrated approach delivers excellent selectivity and sensitivity for reliable organic acid analysis across a wide range of applications.



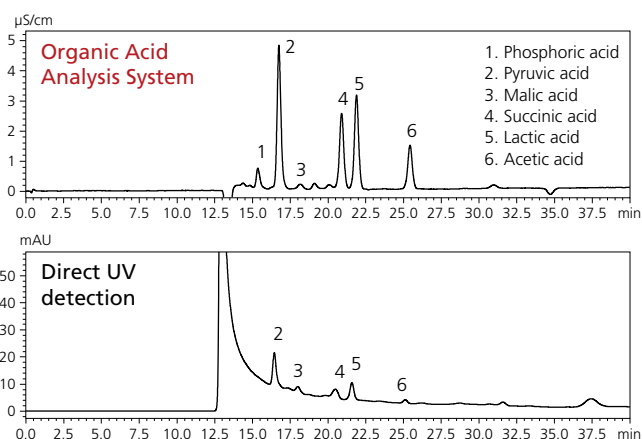
Condition of organic acid in pH buffering method



Flow-line diagram for the Nexera organic acid analysis system

Reliable quantification of organic acids in complex samples

Food products, fermentation samples, and culture media often contain matrix components that can complicate organic acid analysis. The Nexera Organic Acid Analysis System combines ion-exclusion chromatography with Shimadzu's proprietary pH-buffered conductivity detection technology to provide highly selective separation and sensitive detection of organic acids. This integrated approach helps laboratories achieve reliable quantification while minimizing the influence of coexisting sample components.



Example analysis of wine

Combustion Ion Chromatography System

By integrating Nexera IC with an automatic quick furnace, the system provides a streamlined solution for the determination of halogen and sulfur content in liquid and solid samples. Automated sample combustion, absorption, and analysis help improve workflow efficiency while delivering reliable analytical results.



Combustion Ion Chromatography System
(Nexera IC Ion Chromatograph and AQF-5000H Automatic Quick Furnace for Combustion Ion Chromatography)

Automated halogen and sulfur analysis

- Automated combustion, absorption, and IC analysis within a single workflow
- Suitable for halogen-free materials testing, fluorine analysis, bromine determination, and sulfur analysis
- Reduced manual handling and improved laboratory productivity

Simplified calibration workflows

- Direct introduction of calibration standards into the ion chromatograph
- Automated processing from calibration to sample analysis
- Optional automatic switching between multiple standards

Rapid PFAS screening by AOF

- Efficient determination of total organic fluorine content
- Supports rapid screening of PFAS-containing samples
- Ideal for high-throughput environmental and industrial testing

Integrated C-IC Solution Software

- C-IC Solution software enables integrated control of both the Nittoseiko Analytech automatic quick furnace and the Shimadzu ion chromatograph.
- The software calculates the content in samples based on information from the combustion process and the quantitative results obtained by the ion chromatograph.
- The results can be viewed using the data viewer function.

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